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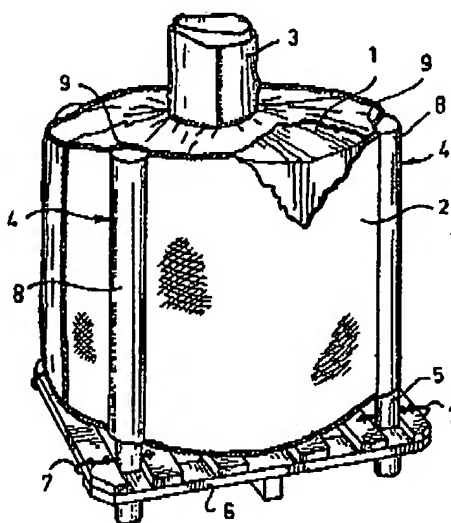
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<p>(21) International Application Number: PCT/FI88/00047 (22) International Filing Date: 31 March 1988 (31.03.88) (71) Applicant (for all designated States except US): OY FLUID-BAG AB [FI/FI]; Bottenviksvägen 54-56, SF-68600 Jakobstad (FI). (72) Inventor; and (75) Inventor/Applicant (for US only) : WIKLUND, Christian [FI/FI]; Råihälvägen 13, SF-67300 Karleby (FI). (74) Agent: OY KOLSTER AB; Stora Robertsgatan 23, P.O. Box 148, SF-00121 Helsingfors (FI). (81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US.</p>		<p>Published <i>With international search report. In English translation (filed in Finnish).</i></p>

(54) Title: **A FLEXIBLE CONTAINER FOR FLUIDS**



(57) Abstract

The invention relates to a flexible container for fluids, comprising an inner bag (1) of a thin material and an outer sack (2) of a durable fabric. The outer sack (2) is cylindrical and its mantle surface is provided with channels (4) for receiving support pillars (5) fastened to a wooden pallet (6). At deceleration during the transport of a full container, the upper ends of the forward support pillars exert great spot loads on the outer sack (2). Such loads can be avoided to a great extent if an outer and an inner side wall (8, 9) of the channels (4) are equally broad in the peripheral direction of the outer sack.

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A flexible container for fluids

The present invention relates to a flexible container for fluids, comprising a liquid-proof inner bag; a substantially cylindrical outer sack which surrounds the inner bag and the mantle surface of which is provided with channels for support pillars, said channels extending in parallel with the central line of the outer sack; and means for filling and emptying the container.

This type of containers known from the prior art are intended for the transport and storage of different kinds of fluids, such as liquids, viscous substances, and bulk goods. Such containers are usually manufactured in two sizes: five hundred litres and a thousand litres. The containers are disposable and they are transported to the user in folded position. Before filling, support pillars are inserted in the channels provided in the mantle surface of the outer sack, and the support pillars are fastened to a conventional pallet of wood, which makes the container easier to displace. The support pillars keep the container in upright position on the pallet.

The support pillars are mounted pivotably to the pallet by means of parallel metal shafts, which are secured to the pallet and extend through the support pillars. This way of mounting is used so as to reduce strains exerted on the support pillars on the pallet.

As mentioned above, the support pillars are positioned in channels provided in the mantle surface of the outer sack. The channels are formed by pockets open at the bottom and closed at the top. The pockets are formed by sewing elongated material strips onto the mantle surface of the outer sack, whereby the

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strips are sufficiently broad for the support pillars to be easily inserted into the space between the mantle of the outer sack and the material strip.

During transport, full containers are often exposed to variations in the transport velocity, whereby retardations in particular may be drastic. At retardation the fluid tends to continue its movement onwards more rapidly than the pallet, wherefore the support pillars swing onwards. The back portion of the sack is thereby lifted upwards along the backward support pillars, and the upper and lower surface of the sack takes an inclined position. The outer sack is thereby exposed to high strains especially at the upper ends of the forward support pillars, but to a certain extent also at the lower ends of the backward support pillars, which may result in breakage in the outer sack.

The object of the present invention is to provide a container in which the above-mentioned strains are considerably reduced as compared with containers known from the prior art. The container according to the invention is characterized in that an outer and an inner side wall of the channels have substantially the same dimension in the peripheral direction of the outer sack.

Channels formed in this way have the advantage that both side walls are strained when the container is filled, whereby they adhere to the support pillar. This results in great friction forces between the side walls of the channel and the support pillar so that strains caused by retardation will not focus on the upper end of the forward support pillars and on the lower end of the backward support pillars. Instead, they are distributed over the whole length of the support pillars. The disadvantageous spot load occurring

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in containers known from the prior art because the container is to some extent movable with respect to the support pillars is thereby avoided. As a result of the great friction forces between the support pillars and the channel wall, the container according to the invention is locked in place with respect to the support pillars, which prevents the back portion of the container from rising up on braking.

The channels according to the invention also have the advantage that they do not project from the mantle surface of the outer sack to such an extent as known channels. Therefore the channels are less exposed to shocks as prior channels.

According to a preferred embodiment, both channel walls are integral with the mantle of the outer sack. When the fabric is formed in this way known per se, the two seams in each channel are omitted, which naturally considerably simplifies the manufacture of the container.

A preferred embodiment of the container according to the invention will be described in more detail in the following with reference to the attached drawing, wherein

Figure 1 is a perspective view of a container according to the invention; and

Figure 2 illustrates a detail of the mantle surface of the outer sack in a horizontal section.

Figure 1 shows a flexible container comprising a liquid-proof inner bag 1 of e.g. a thin polyethylene film; and a cylindrical outer sack 2 which surrounds the inner bag and is formed of e.g. a durable polypropylene fabric. The upper end face of the container is provided with a filling funnel 3 whereas the lower end face is provided with an emptying valve not shown.

The mantle surface of the outer sack is pro-

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vided with four channels 4 which are parallel with the central axis of the sack and which are closed at the top and open at the bottom. A support pillar 5 of e.g. wood is inserted in each channel. Each support pillar
5 is secured to a conventional pallet 6 of wood by means of a metal shaft 7. The shaft is fastened to the pallet and it extends through the support pillar so that the pillar is pivotable round the shaft 7 to some extent.

10 According to the invention the outer side wall 8 of the channels, i.e., the side wall on the outer side of the support pillar, and the inner side wall 9 on the inside of the support pillar have substantially the same dimension in the peripheral direction of the
15 outer sack. This appears most clearly from Figure 2. The dimension of the side wall in the peripheral direction of the outer sack refers to the width of the wall between lines along which the side walls adjoin to form a single wall. The mantle of the outer sack
20 preferably consists of a fabric which is manufactured so that the mantle wall and the side walls 8, 9 are integral with each other.

The container is transported in the position shown in Figure 1 except that the filling funnel 3 is
25 closed. When decelerating a movement perpendicular to the shafts 7, the support pillars 5 are pivoted around the shafts and the container assumes a forwardly inclined position. Thereby the support pillars cause strains on the outer sack especially at the upper end of the forward pillars. Due to the high friction be-
30 tween the pillars 5 and the side walls 8, 9 of the channels, the load is, however, distributed over the whole length of the mantle surface so that the load is at its maximum at the upper end of the channels and at
35 its minimum at the lower end. This distribution of the

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forces over a larger area naturally reduces the peak loads.

5 It is to be understood that in order that the channels would function as desired the outer side wall 8 must not be broader than the inner side wall 9. However, the inner side wall may be somewhat broader than the outer one, because the pressure of the fluid in the container presses the inner side wall against the support pillar 5.

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Claims:

1. A flexible container for fluids, comprising
a liquid-proof inner bag (1); a substantially cylin-
5 drical outer sack (2) which surrounds the inner bag
and the mantle surface of which is provided with chan-
nels (4) for support pillars (5), said channels ex-
tending in parallel with the central axis of the outer
sack; and means (3) for filling and emptying the con-
10 tainer, c h a r a c t e r i z e d in that an outer and
an inner side wall (8, 9) of the channels (4) have
substantially the same dimension in the peripheral di-
rection of the outer sack (2).

2. A container according to claim 1, c h a r -
15 a c t e r i z e d in that both channel walls (8, 9)
are integral with the mantle of the outer sack (2).

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FIG. 1

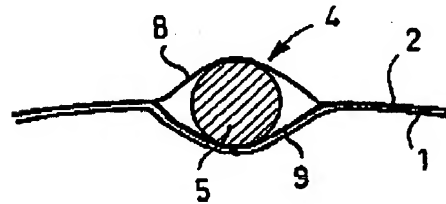
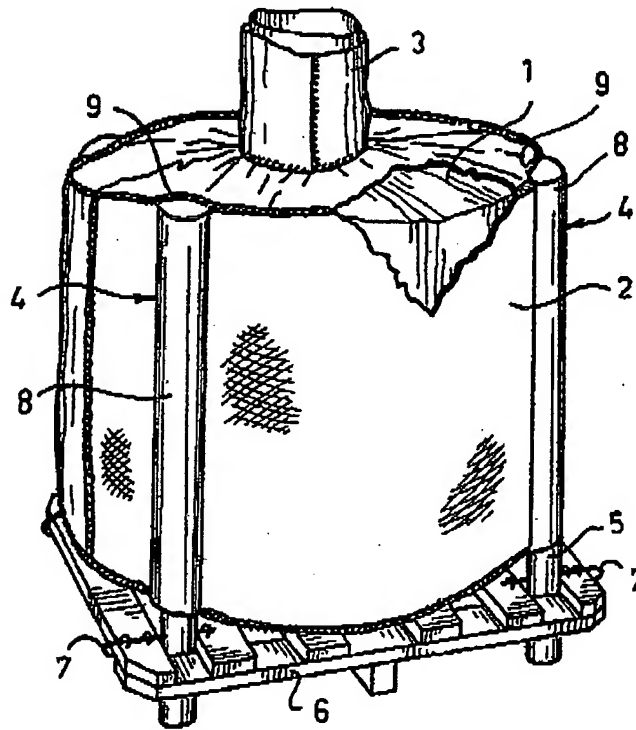


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No PCT/FI88/00047

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ¹ According to International Patent Classification (IPC) or to both National Classification and IPC ⁴ B 65 D 90/02, B 65 D 88/16, B 65 D 30/00		
II. FIELDS SEARCHED Minimum Documentation Searched ² Classification System Classification Symbols Nat. Cl. 81e: 143 IPC 4 B 65 D 19/00-/20, /44, 30/00, /10, 88/00-/24, /52, 89/00-/24, 90/00-/08, /12-/20 Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ³ SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁵		
Category ⁶	Citation of Document, ⁷ with indication, where appropriate, of the relevant passages ⁸	Relevant to Claim No. ¹³
X	US, A, 2 391 374 (C M WICKSTROM) 18 December 1945 See fig 7, page 1, the right column, lines 16-51	1
Y	GB, A, 1 131 113 (INTERFIL LIMITED) 23 October 1968	1
X	See fig 2, page 1, line 80 - page 2, line 23	2
Y	US, A, 4 221 296 (FELL et al) 9 September 1980 See claim 1 GB, 2045721 CA, 1098057 AU, 523004	1
* Special categories of cited documents: ¹⁴ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "A" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the international Search 1988-11-09		Date of Mailing of this International Search Report 1988-11-16
International Searching Authority Swedish Patent Office		Signature of Authorized Officer Ake Carlsson

Form PCT/ISA/210 (second sheet) (January 1985)

International Application No. PCT/FI88/00047

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

II Fields searched (cont)

US C1 150: 0.5, 1, 11, 12;
206: 600;
220: 6, 400-413;
383: 6-10, 105-116

V OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE *

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____, because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim numbers _____, because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING *

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the international searching authority did not invite payment of any additional fee.

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (supplemental sheet (2)) (January 1985)